

	Type	Hits	Search Text	DBs	Time Stamp	Cor r o d e r r o r s C o m m e n t s e r r o r s i n i t i o n
80	BRS	394	705/28.ccls.	USPAT	2003/04/02 05:53	0
81	BRS	177	electronic near inventory	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 05:55	0
82	BRS	131	electronic adj inventory	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 05:55	0
83	BRS	46	(electronic near inventory) not (electronic adj inventory)	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 08:14	0
84	BRS	12	dedicated adj inventory	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 08:19	0
85	BRS	912	(order or supply) near inventory	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 08:20	0

All hits from searches 82, 83, 84, 87, 90, 91, 92, 93, 94, 98 & 99
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	Type	Hits	Search Text	DBs	Time Stamp	Components	Error Definition
86	BRS	0	(order or supply) near inventory and (on adj line)	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 08:21		0
87	BRS	186	(order or supply) near inventory and on-line	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 10:02		0
88	BRS	205	inventory and on-line near transaction	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 10:03		0
89	BRS	205	inventory and (on-line near transaction)	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 10:03		0
90	BRS	16	(inventory and (on-line near transaction)) not (inventory and (on-line adj transaction))	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 10:04		0

	Type	Hits	Search Text	DBs	Time Stamp	Components	Error Definition
91	BRS	189	inventory and (on-line adj transaction)	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 10:09		0
92	BRS	4	"6405178"	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 10:10		0
93	BRS	1	"6405178" and reordering	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 10:11		0
94	BRS	2	"6405178" and ordering	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 11:44		0
95	BRS	0	online adj reorder	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 11:45		0

	Type	Hits	Search Text	DBs	Time Stamp	Error Counts
96	BRS	5449	reorder	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 11:45	0
97	BRS	1347	reorder and (real adj time)	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 11:46	0
98	BRS	6	"6341271" and inventory	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 14:56	0
99	BRS	159	reorder and (real adj time) and inventory	USPAT; US-PGPU B; EPO; JPO; DERWENT ; IBM_TDB	2003/04/02 15:24	0

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- 2. [More than the sum of its parts; Caroline Perkins; ID, New York; Sep 1999; Vol. 35, Iss. 9; pg. 58, 3 pgs](#)
- 3. [MARS The Musician's Planet Signs Pilot Agreement With QCS.net as Part of Their Just-in-Time Product Strategy; PR Newswire, New York; Jun 1, 1999; pg. 1](#)
- 4. [Streamlining storerooms; Thomas A Westerkamp; Maintenance Solutions, Milwaukee; May 1999; Vol. 7, Iss. 5; pg. 26, 2 pgs](#)
- 5. [EDI, VMI meet the Internet age; Anonymous; Metal Center News, Radnor; Apr 1999; Vol. 39, Iss. 5; pg. 21, 6 pgs](#)
- 6. [Inventory management technology?; Tim Triplett; Metal Center News, Radnor; Apr 1999; Vol. 39, Iss. 5; pg. 20, 6 pgs](#)
- 7. [CORPORATE PERFORMANCE 1998 REVIEW: 4TH QUARTER -- Corporate Earnings Climb 3%, As Consumer Demand Helps U.S. Economy Stay on Track; By Tristan Mabry; Wall Street Journal, New York, N.Y.; Feb 16, 1999; Eastern edition; pg. 1](#)
- 8. [Technology and the changing marketing world; William C. Moncrief; Marketing Intelligence & Planning, Bradford; 1999; Vol. 17, Iss. 7; pg. 329](#)
- 9. [Technology corner; Ronald R Tidd; Taxes, Chicago; Jan 1999; Vol. 77, Iss. 1; pg. 7, 2 pgs](#)
- 10. [Panel II: "Implementing acquisition strategies"; Dick McGregor; Defense Transportation Journal, Washington; Dec 1998; Vol. 54, Iss. 6; pg. 34, 4 pgs](#)

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- 5. [Maximizing value in the supply chain](#); Donlon, J P; **Chief Executive**, New York; Oct 1996, Iss. 117; pg. 54, 9 pgs
- 6. [An assessment of motor carrier adoption, use, and satisfaction with EDI](#); Crum, Michael R; **Transportation Journal**, Lock Haven; Summer 1996; Vol. 35, Iss. 4; pg. 44, 13 pgs
- 7. [Portrait of electronic commerce](#); Anonymous; **Computerworld**, Framingham; Apr 29, 1996; pg. 16, 2 pgs
- 8. [A Glass act](#); Donlon, J P; **Chief Executive**, New York; Jul/Aug 1995, Iss. 105; pg. 40, 6 pgs
- 9. [Quick response - Ten years later](#); Hunter, N A; **International Journal of Clothing Science and Technology**, Bradford; 1995; Vol. 7, Iss. 4; pg. 30, 11 pgs
- 10. [Microsoft announces SQL server](#); Auld, Bev; **Business Wire**, New York; Mar 29, 1993; 1; pg. 1

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- 2. [CardPro to invest RM14m in regional business growth; Computimes Malaysia, New York; Feb 14, 2000; pg. 1](#)
- 3. [GERS And Descartes Form Strategic Alliance to Deliver E-Business Solutions to Retail Operations; Business Editors; Business Wire, New York; Jan 19, 2000; pg. 1](#)
- 4. [Developments in the law of electronic commerce; John C Montana; Information Management Journal, Prairie Village; Jan 2000; Vol. 34, Iss. 1; pg. 52, 4 pgs](#)
- 5. [TIBCO SOFTWARE: Tibco Software completes InConcert acquisition; M2 Presswire, Coventry; Nov 9, 1999; pg. 1](#)
- 6. [CME: Chicago Mercantile Exchange unveils for-profit plan; M2 Presswire, Coventry; Nov 3, 1999; pg. 1](#)
- 7. [XEROX: Xerox Document Centre delivers enhanced online access and control of documents; M2 Presswire, Coventry; Nov 2, 1999; pg. 1](#)
- 8. [Currents in compensation and benefits; Fay Hansen; Compensation and Benefits Review, Saranac Lake; Nov/Dec 1999; Vol. 31, Iss. 6; pg. 6, 9 pgs](#)
- 9. [Captura Software Announces Captura P-Card; Strategic Alliance Brings Procurement Capabilities to Captura's e-Finance Solutions Suite; Business Editors; Business Wire, New York; Sep 15, 1999; pg. 1](#)
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- 2. [Personnel communications gets personal; Sue Garrison; AS/400 Systems Management](#), Arlington Heights; Feb 1998; Vol. 26, Iss. 2; pg. 27, 3 pgs
- 3. [COMMERCE ONE READIES SUITE.; Electronic Commerce News](#), Potomac; Apr 21, 1997; Vol. 2, Iss. 16; pg. 1
- 4. [INVESTING - TIE A BOW AROUND PORTFOLIO FOR KIDS; \[Final Edition\]; Carole Gould The New York Times News Service; The Commercial Appeal](#), Memphis, Tenn.; Dec 23, 1996; pg. B.4
- 5. [Online banking: The future according to IBM; Llewellyn, Boxley; Banking Management](#), Chicago; Jul/Aug 1996; Vol. 72, Iss. 4; pg. 46, 2 pgs
- 6. [Natural gas for the winter heating season 1993-1994; McGill, Christopher B; Gas Energy Review](#), Arlington; Dec 1993; Vol. 21, Iss. 12; pg. 2, 4 pgs

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- 2. [Computers, business systems and office products; Avery, Susan; Purchasing](#), Boston; Jul 11, 1996; Vol. 120, Iss. 11; pg. 125, 10 pgs
- 3. [Toy Maker Doesn't Play Games; Anonymous; Computer Decisions](#), Teaneck; Nov 1982; Vol. 14, Iss. 11; pg. 152, 1 pgs

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- 2. [Web site will focus on aerospace MRO parts; Anonymous; Purchasing](#), Boston; Mar 23, 2000; Vol. 128, Iss. 4; pg. S85, 2 pgs
- 3. [Ncom's e-commerce service carves niche by adding value; Laura Newpoff; Business First](#), Columbus; Mar 03, 2000; Vol. 16, Iss. 28; pg. 6
- 4. [Hooker furniture buffs up its delivery operations; Anonymous; Logistics Management and Distribution Report](#), Highland Ranch; Mar 2000; Vol. 39, Iss. 3; pg. 77
- 5. [Parts sourcing takes to the Web; Mary Raift Jordan; IT Support News](#), Yarmouth; Jan 2000; Vol. 20, Iss. 1; pg. 26, 2 pgs
- 6. [Sears spins off HomeLife division; Juikumar Vijayan; Computerworld](#), Framingham; Nov 15, 1999; Vol. 33, Iss. 46; pg. 60, 1 pgs
- 7. [Industry's First 100% Web-Based Billing Systems Unveiled by Savera Systems; Tele2 and Tango Implement First Systems in Europe; Business Editors, High Tech Writers; Business Wire](#), New York; Nov 8, 1999; pg. 1
- 8. [Industry's First 100% Web-Based Billing Systems Unveiled by Savera Systems – Tele2 and Tango implement first systems in Europe; \[1\]; Business Editors; Business Wire](#), New York; Nov 8, 1999; pg. 1
- 9. [The X\(ml\) files; Tony Percy; Enterprise Systems Journal](#), Dallas; Nov 1999; Vol. 14, Iss. 11; pg. S9, 3 pgs
- 10. [HP, TEN Online target air transportation business; Anonymous; HP Chronicle](#), Austin; Oct 1999; Vol. 16, Iss. 11; pg. 4, 1 pgs

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32. **Toy Maker Doesn't Play Games; Anonymous; Computer Decisions**, Teaneck; Nov 1982; Vol. 14, Iss. 11; pg. 152, 1 pgs

33. **Selecting accounting software packages; Vincent J Giovinazzo; The CPA Journal (pre-1986)**, New York; Oct 1982; Vol. 52, Iss. 000010; pg. 40, 5 pgs

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- 2. [Business-to-business or bust for CommerceQuest Series: THE QUEST FOR CAPITAL; \[SOUTH PINELLAS Edition\]; KRIS HUNDLEY; St. Petersburg Times, St. Petersburg, Fla.; Jan 16, 2000; pg. 2.H](#)
- 3. [Managing business-to-business relationships throughout the e-commerce procurement life cycle; Norm Archer; Internet Research, Bradford; 2000; Vol. 10, Iss. 5; pg. 385](#)
- 4. [Changing roles; Computimes Malaysia, New York; Dec 8, 1999; pg. 1](#)
- 5. [KEWILL: RS Components choose Kewill XtraTrade to trade online with their suppliers; M2 Presswire, Coventry; Nov 22, 1999; pg. 1](#)
- 6. [Market Source; Anonymous; Health Management Technology, Atlanta; Nov 1999; Vol. 20, Iss. 10; pg. 60, 4 pgs](#)
- 7. [Miracom's Parts.comTM Completes Web-Enabled Electronic Parts Catalog and Supplier Management Software; Business Editors/High Tech Writers; Business Wire, New York; Oct 21, 1999; pg. 1](#)
- 8. [TRICOSTAR: TriCoStar Limited announces UK launch of ezMerchant; M2 Presswire, Coventry; Sep 3, 1999; pg. 1](#)
- 9. [Value America Selects GE Information Services' Enterprise System\(TM\) To Strengthen Company's One-Of-A-Kind Brand-Direct E-Commerce Business; PR Newswire, New York; Aug 31, 1999; pg. 1](#)
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- 42. [XcelleNet launches fifth-generation RemoteWare 2.0 for remote and mobile applications; Aronin, Mindy; Business Wire, New York; Nov 28, 1994; 1; pg. 1](#)
- 43. [A directory of software publishers; Anonymous; Metal Center News, Radnor; Jul 1994; Vol. 34, Iss. 8; pg. 48, 8 pgs](#)
- 44. [Beyond re-engineering: The three phases of business transformation; Davidson, William H; IBM Systems Journal, Armonk; 1993; Vol. 32, Iss. 1; pg. 65, 15 pgs](#)
- 45. [EDI: The Information-Intensive Way to Move Cargo; Glatzer, Hal; Computerworld, Framingham; Sep 7, 1992; Vol. 26, Iss. 36; pg. 69, 2 pgs](#)
- 46. [Sun Systems Now Used for Many Applications in Various Segments of the Retail Industry; Swingle, Lauren; Business Wire, New York; Jan 13, 1992; 1; pg. 1](#)
- 47. [Office Products and Business Systems: For Whom the Bells Toil; Evans-Correia, Kate; Purchasing, Boston; Nov 23, 1989; Vol. 107, Iss. 9; pg. 82, 3 pgs](#)
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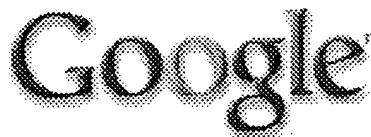
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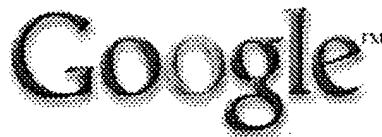
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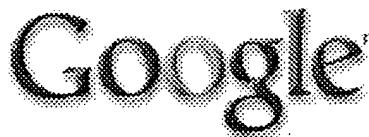
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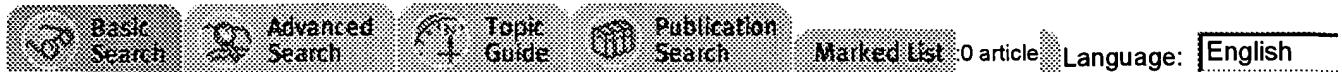
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Building and maintaining customer relationships is the key to success in e-commerce and, unless service is maintained, customer loss may result, more than offsetting any cost efficiencies due to introducing e-commerce technology. Since the core of e-commerce is information and communications, support for managing customer relationships is available to those who know how to use it. How technology can be used to encourage and facilitate customer-business relationships is discussed. It is shown through a customer relationship life-cycle model how the management of related procurement functions in customer companies can adjust to take advantage of these relationships.

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Norm Archer: Norm Archer is a Professor of Information Systems in the Michael G. DeGroote School of Business at McMaster University, McMaster University, Hamilton, Ontario, Canada.

Yufei Yuan: Yufei Yuan is a Professor of Information Systems, both in the Michael G. DeGroote School of Business at McMaster University, McMaster University, Hamilton, Ontario, Canada.

Introduction

In the business-to-business (B2B) e-commerce environment, interorganizational information systems (IOS) have been used since the early 1970s to link one or more firms to their customers or suppliers through private value-added networks. IOS make use of standard protocols to share information among participating companies through

computer-to-computer exchange of electronic documents relating to purchasing, selling, shipping, receiving, inventory, financial and other activities. These forms of IOS are commonly referred to as EDI systems. Distinguishing characteristics include an investment in systems and organizational infrastructure in order to participate, and the volume of business required to justify this investment. They typically have little to offer in terms of end-user interaction and support. But the range of application of IOS has now grown from simply handling transaction data to supporting all forms of information exchange, including procurement transactions, supply chain management, sourcing information, new product development, shared electronic mail, etc.

The advent of commercial applications on the Internet, and their integration with internal information systems such as intranets and enterprise resource planning (ERP) systems, have resulted in significant changes in networking and other technologies available for IOS, allowing other business functions to make use of these networks. As a result, the importance of IOS is increasing dramatically, either as private networks connecting cooperating organizations, or as networks linked through the Internet (Segev et al., 1997). An industry study (Aberdeen, 1999) showed a resulting average 5 to 10 percent reduction in prices for goods and services through lower material and service costs, reduction of acquisition and order fulfillment cycle times of 50 to 70 percent, reduction of requisition processing costs of 70 percent per order, and improved inventory management practices.

More advanced IOS extensions that affect supplier-customer relationships include Web-based interfaces, integration with supplier catalogs and internal information systems, and built-in business transaction rules based on purchase limits or negotiated contracts. These allow end-users to order products and services (P/S) on-line without intervention by the purchasing department, including automatic fulfillment by the supplier organization, and payment via electronic funds transfer or purchasing cards. Tightly linked supplier-customer relationships, such as those between parts suppliers and automobile manufacturers, use IOS to link suppliers to customer inventory and production forecast data, with supplier responsibility for automatic replenishment.

Supplier-customer relationships depend on the functional activities involved. The primary activity classifications in a value chain are incoming logistics, operations, outgoing logistics, marketing and sales, and service (Porter, 1985). How these activities are carried out, and how they interact with one another, continues to be re-defined as technology provides more sophisticated methods for business interactions (Walton and Miller, 1995). The network links that are active from supplier to customer during the customer's procurement process are driven by marketing and sales functions, supply chain management and order fulfillment (operations and outgoing logistics at the supplier end, and incoming logistics - receiving, stocking, distribution, at the customer end), and after-sales service. When a network links supplier and customer, in each of these functions information is input, used, generated, and transmitted by internal information systems and potentially shared between supplier and customer through an IOS. In each function there are opportunities to gather information during customer procurement activities, and to use this information to improve the possibility of continuing and profitable relationships by working constructively with customers.

The two main methods for coordinating the flow of goods and services in the marketplace are markets and hierarchies (Malone et al., 1987). Markets coordinate the flow through supply and demand forces, while hierarchies (with pre-determined customers and suppliers, such as manufacturing assembly plants and their component suppliers) rely on managerial decisions to coordinate flows. "Mixed mode" network structures, an intermediate form of marketplace, are a situation-dependent form existing in many business relationships, which blend hierarchical and market structures in a coordinated manner. The advent of the Internet has led to an evolution in the types of IOS that can support these market structures, with the added benefit of market coordination, reductions in coordination/transaction costs, and lessening P/S specificity.

Networked commercial applications, especially on the Internet and through IOS, have resulted in many changes in how B2B transactions can be carried out. Benefits from such approaches include rapid data exchange, low inventories, and quick response. All of these require a high degree of interaction and some degree of system integration between supplier and customer. At the same time, suppliers now have an electronic "push" channel for their marketers, and new ways to manage sales, distribution, and support services. Current trends in e-commerce, strategic alliances, supply chain integration, and globalization (Avery, 1999) are facing purchasers, suppliers and distributors with major challenges in creating value from these new channels.

The purpose of this paper is to examine the impact that the new technologies have had on the support of relationships between suppliers and business customers. This is especially important in the light of the current trend of enhancing these relationships by reducing the number of suppliers and increasing the level of collaboration between supplier and customer (Clemons et al., 1993). We discuss the supplier business functions that are involved, including marketing, sales, supply line operations, and after-sale services, and the related customer

procurement function. To explain how supplier-customer interactions have changed, we develop a business-customer relationship life cycle to evaluate the form of these interactions at each phase of the life cycle. We observe how modern technologies can support these relationships from both the customer's and the supplier's perspectives. Finally, we summarize the impact of these technologies on supplier-customer relationship development and management.

Relationships through marketing and sales

Marketing approaches depend on the availability of systems to gather, store, analyze, and manipulate the information generated by customer transactions and supplier-customer interactions. The two major perspectives on marketing and related supplier-customer interactions (Gronroos, 1994) are transactional marketing and relational marketing.

Transactional marketing (Brodie et al., 1997), is an arms-length, impersonal approach assuming an active seller to a marketplace inhabited by passive customers. This company-centric model assumes an homogeneous marketplace, with information delivered to the marketplace and little feedback in the other direction except through the ultimate sales rate. Its focus is on the economics of the transaction, and it does not attempt to build beyond the immediate sales event. Marketing is based on the marketing mix concept, and some form or extension of the four Ps of marketing (product, price, place, and promotion) (McCarthy, 1960; Gronroos, 1994; Archer et al., 1999). An example is marketing products to transient customers passing through a region where there is little likelihood that they will ever return.

The relational marketing perspective has developed more recently (Brodie et al., 1997; Nevin, 1995; Weitz and Jap, 1995). This concept has received a considerable amount of attention in both the academic and business literature. Different perspectives offered on this topic include:

- promotion (targeted customers identified through marketing databases);
- building relationships with individual customers;
- retaining customers after the initial sale; and
- strategic shift from customer manipulation to customer involvement (Nevin, 1995).

Recent research has examined how technologies can be applied in an innovative manner to build relationships with customers, suppliers, and competitors, for value creation through cooperative and collaborative efforts (Evans and Wurster, 1997).

Relationships in the B2B environment are based heavily on information exchange, which has a fundamental effect on market growth and structure (Hakansson, 1989; Naude and Holland, 1996). Relational marketing includes relationships or networks among companies and their suppliers, lateral partnerships among competitors, government, and non-profit organizations, internal partnerships with business units, employees, and functional departments, and buyer partnerships with intermediate and ultimate customers (Morgan and Hunt, 1994). Collectively, these represent complex arrays of relationships among organizations, operationalized through information transfers. Interorganizational information systems enhance support for relational marketing techniques, because of their ability to maintain ongoing communication between supplier and customer (McKenna, 1991), allowing many cycles of communication to occur in a short time, and browsing and buying activities to be captured in a database for future evaluation.

Transactional marketing can and does co-exist with relational marketing (Brodie et al., 1997), and these two perspectives can be considered as a continuous spectrum (Gronroos, 1994). Although not yet a mature approach, relational marketing has for some time made significant inroads in industrial and services industries (Hakansson, 1982). A major difference between the two approaches is that transaction-oriented marketing tends to emphasize the short term, while relational marketing emphasizes longer term market development with business customers (Kotler, 1986).

Relational marketing approaches that are relevant to B2B relationships include interaction and network marketing. Interaction marketing implies genuine interaction between supplier and customer, and must be mutually active,

adaptive, and continuous, if it is to be effective. Maintaining interactive relationships includes activities such as regularly advising registered customers of new products, product updates, sales and promotions via e-mail.

Interaction marketing can involve individuals across different functions and levels in the firm (Coviello et al., 1997) and the entire company should be market-oriented to maintain effective customer relationships. The market orientation of a firm (the organization-wide generation of market intelligence, dissemination of the intelligence across departments, and organization-wide responsiveness to it) is an important determinant of a firm's performance (Jaworski and Kohli, 1993). Internal activities of this type (e.g. market situations, goods shipments, customer responses) can be supported through internal intranet functions that disseminate information and assist in coordinating cross-functional group work. Internal systems also support interactions and exchange of information among product designers, developers, and manufacturing partners, via e-mail, e-conferencing, groupware, and secure negotiation support systems (Beam et al., 1999; Yuan et al., 1998).

Network marketing is the modern equivalent of industrial marketing. It refers basically to longer term relationships that exist between a business customer and its suppliers. A business network is a set of connected relationships, and these may emerge through interaction between managers at different levels of these firms (Johanson and Hallen, 1989). The business network may be utilized by managers outside the marketing function, and it typically takes on a more strategic role than other marketing classifications (Coviello et al., 1997; Jarillo, 1988). Network marketing has long been practiced in B2B commerce, where switching costs are typically high due to the long-term commitments that may exist between suppliers and customers. Industrial marketers coordinate the marketing-relevant activities of a company with the procurement needs and information requirements of the buying company (Spekman and Johnston, 1986).

Recent years have seen a trend to encourage fewer and more permanent inter-company trading relationships if initial transactions are satisfactory (Bakos and Brynjolfsson, 1993). Relationships may include trade agreements such as open purchase orders to facilitate ordering and delivery of P/S with lower costs, fewer errors, and shorter delivery times. This may progress towards tighter integration where companies are linked electronically via IOS so that, for example, the supplier may have access to information on the customer's inventory levels, forecast production requirements, and product designs.

Relationships through supply chain management

Supply chain management is the integrated administration of goods and services from the supply side, including the logistics and operations components of the value chain, through the transformation process and distribution channels to the customer. IOS assists by linking inventory, billing, and shipping to customers and suppliers, complementing marketing, sales, and service processes that provide the supplier-customer interface. Through the order fulfillment and after-sales service processes, supply chain management intersects with marketing and sales.

Supply chain management strategies involve business relationships that can be competitive, collaborative, or some mix of these two. Choices among these strategies depend on existing and desired relationships between supplier and customer, measured by a number of characteristics, such as (Hughes et al., 1998) degree of trust, correlation with common goals, personal relationships, continuity of key staff, expectations of both parties, internal functional level support of external relationships, expected benefits, frequency of switching to other partners, and level of collaboration.

How the supply chain is managed for a particular customer is determined by the customer's approach to procurement. The balance chosen by the customer between competitive and collaborative sourcing depends on the marketplace and on supplier capabilities (Hughes et al., 1998). Competitive sourcing is appropriate if sourcing tends to be ad hoc, there is an over-supply in the marketplace, little real market differentiation among P/S, rapid evolution of innovation, and the customer is interested in testing supplier capabilities. This is supported by electronic marketplaces, and implies less relationship building and more attention to cost efficiencies. Evidence of free market competition includes spot buying, bidding and tendering. On the other hand, collaborative sourcing is the best choice if supplier and customer have complementary capabilities and resources, access is needed to vital assets and unique innovation, there are strong and enduring relationships, common values and goals, and (typically) support by market hierarchies.

Fulfillment can be supported by Internet systems through, for example, access to shipment status at on-line company or delivery service databases (e.g. Fedex.com^{[sup][registered]}), delivery via Internet of software products and information services (e.g. TopSoft.com^{[sup][registered]}), access to secure transaction services while purchasing P/S, and performing on-line selection and/or customization (e.g. Cisco Connection OnLine^{[sup][registered]}) with

the help of software agents. Fulfillment is a yardstick by which customers measure organizational performance, as the promise to the customer is either fulfilled or broken - the product is delivered, the utility is turned on, or the software is enabled. The difference between fulfilling or breaking that pledge can mean the difference between lost business and a lifetime customer. The fulfillment function offers significant opportunities for cross-selling and up-selling to satisfied customers.

Service functions offers opportunities for collecting and disseminating customer information, helping the organization tailor responses to customers, and developing future product designs. Services may include access to service functions (updates on product, service offerings), or software updates delivered and installed remotely.

The business procurement life cycle

Business procurement life cycles that have appeared in the literature include a variety of phases that cover information gathering, negotiation, fulfillment, maintenance and disposal (Gebauer et al., 1998; Nissen, 1997; Bhargava et al., 1997; Novack and Simco, 1991). Drawing from this literature, we have developed a more detailed seven phase life cycle to match activities between supplier and customer organizations. For the customer, the phases are activities that are pursued in acquiring goods and services to meet the requirements of the firm. For the supplier, these phases create opportunities and activities for marketing, sales, supply management and fulfillment functions, as well as the service function. The procurement life cycle provides opportunities for a business relationship to begin, develop, or decline.

As seen from the customer's perspective, the procurement life cycle includes the activity phases shown in Table I, although not necessarily in the sequential order indicated. For example, there may be defections and returns to previous phases, if the process between customer and any specific supplier breaks down at any time. This process forms an ongoing interactive exchange, through coordinated arrangements between the parties, for the purpose of common business advantage. There is no fixed time interval over which the life cycle can occur. It is situation dependent, taking as little time as a few hours or days in a competitive scenario, ranging up to several years in a collaborative scenario.

The customer relationship life cycle

Table II outlines phases in the customer relationship life cycle, which parallel the phases in the business procurement life cycle. Customer and supplier activities during each of the phases are summarized. Each activity can influence a decision to move to the next phase or to abandon further contact. Supply chain functions, tools the supplier may use in each of the phases, and moderating factors that may influence customer decisions, are also included. Although marketing and sales play the most significant role for the supplier in maintaining customer contact, supply chain functions also affect customer support, either directly or indirectly. During the first four phases of the life cycle, the concentration is on establishing a relationship. In the last three phases, the emphasis is on building loyalty, trust, and commitment that will result in a lasting relationship.

The customer procurement function is involved throughout the process, including end users, engineers, and purchasing agents. As with the procurement life cycle, there is not necessarily a linear progression from one phase to the next, but it is more likely to be an iterative process, where the customer or supplier may defect at any phase if the relationship is not proceeding successfully. For example, the customer may decide that the supplier's P/S does not meet requirements during the negotiation phase, or the supplier may decide that the customer does not have an acceptable credit rating. The customer may then re-cycle back to a previous phase to continue searching for other P/S which meet known needs. The last phase in the model is the re-purchasing decision, which may lead to a simple re-purchase decision, the solidification of the relationship through a firm long-term contract, or termination of the relationship if previous P/S experience was not satisfactory. The seven phases are outlined briefly in the following (Table II):

(1) In phase 1, the customer searches for information on available P/S. A large variety of moderators influence the customer's perceptions of the information collected, including word-of-mouth, competitors, corporate image of the supplier, brand awareness, and previous experience with the supplier. Suppliers can create positive awareness by joining electronic marketplaces or advertising through company Web sites (e.g. Cisco.com[sup][registered]), multi-vendor catalogs (e.g. WIZnet.net), or distributor sites (e.g. Avnet.ca[sup][registered]), where potential customers can find information on available P/S. This improves the potential customer's searching efficiency, helps to identify P/S that would otherwise not be known to the customer, and helps new businesses to enter the marketplace. If the supplier already has an ongoing relationship with the potential customer, continuing customer interaction is essential to keep the supplier company responsive to the customer's needs.

(2) In phase 2, the customer has developed a list of potential suppliers, and gathers more information about the P/S to determine if they suit the company's needs. Web technology to provide information on company background, product and service information, and service details, is normally backed up by e-mail to contact supplier sales representatives. To compete successfully a supplier must be either the low-cost supplier or compete on features other than price. This requires differentiation on other features such as quality, delivery, and service support. This information can be advertised through on-line catalogs, followed up by interactive marketing to ensure that customer needs are determined, and satisfied if possible. Supplier choice can be influenced by the availability of trial products, the quality and performance of products, and the availability of customization options.

(3) Background review often includes evaluation of test P/S quantities from a short list of suppliers, and making contact with the supplier's current or previous customers. Obviously, supplier and product reputation, and the experience of other customers will play a large role in motivating a positive outcome at this phase. One way that suppliers can increase potential buyer trust is by providing short case studies on their Web site about previous installations of their products, including contact information (see, for example, the  Microsoft site at <http://www.microsoft.com/Industry/>). Supplier sales people maintain continuing interaction throughout this phase with those buyers indicating an interest in their products or services.

(4) Negotiation is the final stage in making the sale, with a sales contract as the outcome if successful. Warranty, commitment, and pricing discounts by the supplier, and the trust built up with the customer, as well as the customer's goals, play a role in successful completion of the contract. Groupware, electronic conferencing, and remote negotiation support systems (Beam et al., 1999; Yuan et al., 1998) can assist end-users, purchasing agents, and supplier sales personnel in negotiating appropriate agreements on price, design, delivery, and payment schedules. Negotiation by bidding through on-line Web auctions such as IndustrialBid.com^{[sup]1} is becoming a popular method to acquire P/S that are being disposed of by companies with surplus or obsolete stocks, a normal marketing practice in some industries. If trading partners choose to install an IOS interface to manage transaction processing during the life of the contract an important consideration will be its cost (including conversion costs), and how to apportion that cost. The investment is at risk, since at least part of the investment will be lost if the relationship does not become long term and is terminated at the end of the contract.

(5) During fulfillment, an IOS link between supplier and customer may be established if the relationship is collaborative. This link will manage transactions that derive from the contract, through EDI interfaces that may include customer and supplier financial institutions. Such a link can include just-in-time shipping and other supplier services such as management of the customer's inventory and component quality functions. Linkage between a supplier Web site and an internal ERP system is demonstrated at a joint KPMG² Hewlett Packard site <http://www.kpmg-hp.com/>. In a marketplace IOS that utilizes a multi-vendor catalog, the customer can carry out the P/S search through the IOS and, when the contract has been negotiated, also have fulfillment managed through the IOS. Technical problems such as engineering design adjustments can be supported by distributed engineering (Hirsch et al., 1995). Supply chain management software (Berger, 1997) can be very effective in providing the supplier with links between marketing, manufacturing, and distribution, to forecast and schedule manufacturing and delivery of customer orders. Customers and supplier performance depends on environmental conditions such as third party activity (e.g. shippers, unions, etc.), and their perceptions are based on expectations generated during previous phases in the life cycle (e.g. promised delivery dates, payment schedules, etc.).

(6) During consumption, maintenance, and disposal, the P/S quality becomes very familiar to the customer, and customer loyalty can develop. However, if expectations are not matched by perceptions, the relationship may be damaged. Automated service support (backed up by support personnel when necessary), on-line training, and cross-selling, are all important supplier activities during this phase.

(7) The renewal phase involves a review of customer experience with the P/S, and a decision on whether or not to renew a contract and/or continue purchases from this supplier. Internal information systems that track supplier performance, including delivery, service, P/S quality experience, and other criteria, can be valuable in supporting decision-making in this phase. The network relationships established by supplier sales and marketing personnel, in conjunction with favorable delivery performance and service support from production operations, give the current supplier an advantage over competitors at this point. For the customer, it is more convenient to re-purchase the P/S from an existing supplier, since both the P/S and supplier service and support are known quantities. Going to another supplier would involve re-tracing the first three steps in the relationship life cycle, at a cost that is worthwhile only if experience with the current supplier and its P/S has been unsatisfactory. Further, the switching costs from moving to a different supplier, if there is an IOS linking the two firms, is a disincentive to change. These factors enhance the likelihood that a relationship, once established, will continue.

Management success factors

Based on our analysis of supplier-customer relationships throughout the customer relationship life cycle, we suggest that the following are important considerations when making management decisions related to e-commerce B2B systems. Every consideration is influenced by the improved availability of information, and communication speed through advanced technologies:

- Successful B2B relationships, by their nature, tend to start as ad hoc market relationships, but if they continue they may eventually lead to more collaborative relationships. The current business trend is towards fewer suppliers (Gronroos, 1994), with a higher degree of collaboration between supplier and customer. As a result, more of the procurement process can be automated, resulting in lower transaction handling costs and higher volumes for the remaining suppliers, and faster and more reliable delivery for the customer. Supplier savings may be passed to customers through discounts.
- No amount of advanced technology can replace human interaction in establishing and maintaining business relationships. However, IOS and related technologies can improve support for supplier and customer alike, leaving them with more time to pursue those activities that cannot be automated easily, thus providing better service and improved relationships with existing and potential partners. Better forms of communication can also dramatically facilitate interaction between business partners.
- A substantial investment may be needed to install and maintain proprietary IOS applications (including multi-vendor catalog systems and EDI systems), in addition to the cost of converting and integrating existing internal information systems. Until communications and data standards are more widely adopted, this increases the risk from engaging in a collaborative relationship, since switching costs will tend to be high. This must be balanced against the potential reward, in the form of reduced transaction processing costs, increased end-user involvement in procurement transactions, and more effective purchasing decisions.
- Sourcing activities - (information gathering, supplier contact, background review, and negotiation) are the customer activities that tend to be the least structured in the customer life cycle, and hence least amenable to automation. However, Web technology is highly beneficial in supporting information access and interaction to ease the process. Also, once a collaborative relationship is established between supplier and customer, activities in the fulfillment phase are likely to be more routine and amenable to automation support.
- Mismatches between the degree of automated support for end-users at any of the life cycle stages between supplier and customer are likely to result in sub-optimal performance and/or failed relationships. These are more likely to occur if either the supplier or customer is much larger than its partner. For example, if the supplier cannot integrate its order management system with the customer's, orders may have to be mailed, telephoned, or faxed to the supplier, increasing delays, error rates, and costs. Hence it is important to ensure that these mismatches do not occur, if the relationship is to be collaborative. This may include offering a subsidy and technical assistance to the partner that lacks the appropriate system, so a compatible system can be implemented.
- Market orientation of the supplier firm can have a positive effect on many of the moderators listed in Table II that affect the relationships between supplier and customer, and how the P/S is marketed, sold, and serviced, and the contract is fulfilled. Unless the entire supplier firm, including especially supply chain management, marketing, and sales, is market oriented, methodologies and technologies supporting customer relationships will be less effective. This may result in a reduction in customer loyalty and a loss in profitability (Jaworski and Kohli, 1993) if there is a gap between customer expectations and perceptions (Zeithaml et al., 1988).

In this paper we have examined the state of supplier-customer relationships in the context of the newer IOS technologies, organized through the use of the customer relationship life cycle. The state of the applications and the technology involved is currently subject to very rapid change, but one current trend is towards more on-line electronic marketplaces, hosted by intermediaries or major customers, and marketed through high-volume Internet portals. The IOS that link suppliers and customers will improve along with the integration of the applications they support, and the development and widespread application of data standards and technologies, such as XML, will help reduce the cost and improve the portability of IOS applications. At the same time, improved end-user customer access will reduce the need for human intervention by purchasing agents and other support personnel. In theory, an ever-larger proportion of the less structured activities in the customer relationship life cycle can be automated through the application of newer technologies such as expert systems and intelligent software agents. However, the main benefit of any such advanced systems will be to allow increased attention to more effective inter-company relationships by supplier and customer personnel.

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[Illustration]

Caption: Table I; Business procurement life cycle; Table II; Customer relationship life cycle activities, functions, tools and moderators

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AND	inventory
AND	automatic
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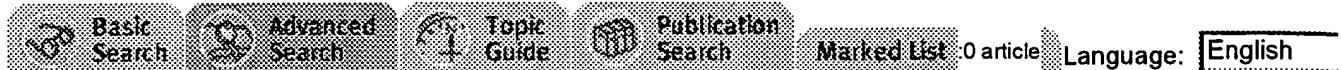
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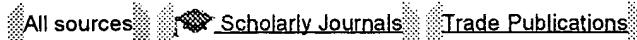
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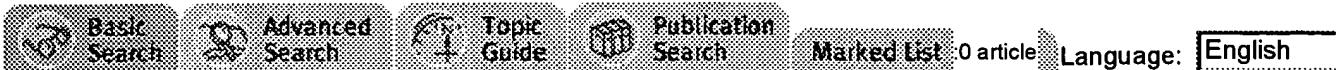
InformationWeek. Manhasset: Jan 30, 1995. p. 76

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Purchasing

Computers, business systems and office products

Avery, Susan. *Purchasing*. Boston: Jul 11, 1996. Vol. 120, Iss. 11; pg. 125, 10 pgs

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Abstract (Article Summary)

The 1996 annual review of software packages that can increase the efficiency of the full-spectrum of purchasing tasks is presented. Numerous products are reviewed.

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[Headnote]

Here's our annual review of software packages that can increase the efficiency of the full-spectrum of purchasing tasks. For more information from suppliers, refer to the telephone and fax numbers at the end of each description.

Acqion. Global Electronic Trading Services (GETS) is a proprietary electronic commerce system developed to streamline supply chain management. It links buyers, suppliers, distributors, manufacturers, and financial institutions around the world, producing an integrated trading community in realtime. It is a Windows-based, client/ server application with user "point and click" functionality. GETS consists of three modules: electronic catalogs, both private and public, for searching through and requisitioning from supplier catalogs; Global Bid Board, for buying custom-engineered items or large catalog quantities; and SurplusLink, an Internet-based service for buying and selling surplus and excess inventory internally and externally. Tel: (864) 2814646; Fax: (864) 281-4576; E-mail: acqion.com

ADP.GSI. TOLAS software offers a variety of modules, including purchase order management and purchasing analysis. Users select only applications that are suitable to their needs. Purchase order management module

supports centralized, decentralized, and partially decentralized purchasing. It is EDI-compatible and has split delivery capabilities so users can have product delivered to multiple locations from a single order. Purchasing analysis module helps evaluate supplier performance in the areas of quality, price, and delivery. Tel: (412) 963-6770; Fax: (412) 963-6779.

Advanced Procurement Systems. APS is a PC-based (single-user or network) modular system that includes the NIGP 5-Digit Commodity/Service Code. Purchasing module automates all aspects of supplier management, requisitions, RFQs, bid response tracking, bid evaluation, POs, and management reports. Users can electronically submit requisitions and inquire about status online. APS also provides EDI capabilities. APS Stock Inventory automates all phases of inventory management. Integrated with APS Purchasing, it completely automates the purchase reorder cycle. Both purchasing and inventory can interface with an accounting system. Tel: (800) 448-0760; Fax: (512) 343-0131; E-mail: aps@bga.com

Alliance Manufacturing. For the small to mid-sized enterprise, Alliance/MFG for Windows offers Bill of Materials, Material Requirements Planning (MRP), Capacity Requirements Planning, Purchase Orders, Sales Orders, Labor Distribution, Physical Inventory, Shop Floor Control, plus links to 15 leading accounting programs and an AutoCAD interface. Tel: (800) 4902520; Fax: (805) 957-4555; E-mail: alliancemfg.com

American Business Systems. ABS Purchase Order System (7.0) is designed to improve ordering and receiving efficiency by monitoring supplier, buyer, and product information. Module can be used as a stand-alone solution, or it can be integrated with a variety of ABS modules, including Wholesale Distribution, Point of Sale, Accounts Payable, and General Ledger. Purchase Order processes regular, standing, and blanket POs, and includes time-saving features that allow users to copy existing POs after entry. Features include the ability to anticipate stock shipments from suppliers, inquire about a PO by number, product, supplier, or location; and to monitor items received, rejected, or returned. User-definable "allowable variances" analyze price, quantity received, and timeliness of delivery. Purchase Order also supports items with serial and lot control numbers, multiple suppliers per product, plus multiple terms and buyer instructions by product and supplier. Tel: (508) 250-9600; Fax: (508) 250-8027; E-mail: abs_software.com

American Management System. Procurement Desktop offers large organizations a client/server system (for LANs, WANs) that automates the purchasing process startto-finish. Built as a Windows system, the graphical user interface models a typical office desktop. Users across the organization, including remote users, can prepare requisitions online and forward them for automatic approval routing. Other support for the buyer includes PO processing, contract preparation/management, and supplier management. Workload assignment module allows managers to distribute work assignments to staff and to track the status and history of all work. Reporting capabilities provide access to information needed to negotiate volume purchase agreements and other costsaving measures. Tel: (800) 841-6713; Fax: (703) 2276704; E-mail: amsinc.com

American Software. Supply Chain Purchasing is a multi-platform client/server solution that provides the features for communicating purchase requirements, converting requirements into POs, creating the status of open purchases, receiving inspection as well as matching supplier invoices and preparing financial data. Supply Chain Purchasing also is integrated with inventory, manufacturing, distribution, and financial systems. This system eliminates redundant data and provides a real-time, continuous information flow in procurement cycle management. Additional features include Flexible User Controls, Supplier Management, Supplier Performance Analysis, Requisition Management, On-line Buyer's Worksheet, Purchase Order Management, Time-phased Pricing, On-line Receiving and Inspection, Invoice Matching and Vouchering, EDI Support, and Financial Integration. Tel: (404) 264-5296.

American Tech. P.O. WRITER PLUS is designed for use on PCs and local area networks (LANs). It has 14 modules: Purchasing (with PO create, history, and summary report capabilities); Receiving (with receipt transaction recording/history and open order status); Supplier Performance (which rates delivery, price, quality, and overall supplier performance); Inventory Control (with inventory status, usage history, and automatic reorder analysis); and Payment Approval that allows three-way matching of PO, receipt, and invoice. Other P.O. WRITER PLUS modules include FAX/EDI, Data Interface Utility, Purchase Requisitioning, Stock Requisitioning, Bar Code Interface, Ad Hoc Reporting, and Equipment & Service Tracking (EAST). PurchasingNet is an intranet application that eliminates the overhead, waste, and frustration associated with traditional purchasing/requisitioning. It can be implemented as an extension to any purchasing or accounting system. Tel: (908) 9468844; Fax: (908) 946-3102; E-mail: powriter.com

Applied Micro Business Systems. Stock-Master is a PC-based inventory and purchasing management system. It has PO writing and tracking capability and can monitor PO status down to the line item level. Included are supplier

performance and procurement support modules which maintain a database of suppliers for each item and can generate user/supplier item number cross reference lists, best leadtime analysis, best price analysis, and most current analysis. Also included is Access-Master, a Windows-based "bridge" that imports the entire Stock Master database into Microsoft's Access database management system. This allows users to perform their own queries, design reports and analysis, and set up purchasing documents specific to their needs. Tel: (714) 723-0582; Fax: (714) 675-5325.

Armor Systems. Purchase Orders, part of the Armor Advantage series software package, automatically creates POs for items below minimum quantity, prints a forecast of items to be received, and posts orders and receipts to Inventory Control in real time. Users can order/receive items for multiple warehouses, process inventory and non-inventory items, and print supplier SKU numbers on the order. Purchase Orders allows users to plan for future deliveries, and track item and purchase order status. Other modules include Accounts Payable, Accounts Receivable, General Ledger, Inventory Control, Billing, Order Entry, Fixed Assets, and Report Generator. Tel: (407) 323-9787; Fax: (407) 330-0442.

Bellwether. Purchasing Management Extra (PMX-2) is a full function purchasing system for PCs and PC networks. PMX-2 includes the following modules: Purchasing (with supplier management, PO generation, PO history, and management reports); Receiving (receipt entry, open/overdue order tracking, and supplier performance ratings); Requisitions (requisition entry and automatic conversion to POs); Inventory (inventory balances tracked at multiple inventory warehouse locations); Request for Quotations (RFQ generation for preferred suppliers, supplier bid entry, and conversion of successful suppliers' RFQ to PO); Accounts Payable interface (online matching of invoice to the PO and receipts, and transfer of "matched" to invoices to AP system for payment); Fax (POs and RFQs faxed directly to the supplier's fax machine). PMX-2 can be implemented in modules or as a complete system. Tel: (502) 426-5463; Fax: (502) 423-8963.

Bristol Information Systems. The BISiness Purchase Order Management System provides features and functions to control every aspect of purchasing from order through receipt. Purchase Order Master File can be updated quickly and directly with all input edited as it is entered. Features include: direct online output to BIS Accounts Payable, General Ledger, and Cost Ledgers; complete system back-up procedures, computer-printed worksheets for new suppliers; and blanket order controls (at orders, receipts, or invoice processing). Tel: (800) 984-8600; Fax: (713) 242-9309.

Charleston Financial Services. PURCHA\$ING AT A GLANCE for DOS and Windows is a PC/LAN software program that streamlines the generation of requisitions and POs for items located in inventory as well as capital purchase items. Supply catalog is system-generated and continually updated. The program alerts the user when to reorder inventory items and combines requisitions from multiple departments onto a single PO. Back-ordered items are automatically routed to the correct department or drop-shipped to the desired destination. Materials received may be logged in by item or PO. Delivery lists are system generated. System tracks expenses of each department on a monthly, quarterly, yearly, or other periodic basis. A purchasing history can be generated. It maintains a perpetual inventory, reporting on its value and quantity as desired. It also reports and graphs usage of stock items. Tel: (800) 7927224; Fax: (803) 529-5712.

Cincom. CONTROL: Purchasing manages all buying activities from RFQs through receiving and online history. It provides control, access to shared information, and integration with manufacturing and accounts payable, while minimizing clerical effort. Modules include: Purchased Item Definition, Vendor Definition and Sourcing, Quotation and Bid Management, Requisition Creation and Tracking, Purchase Order Management, Receiving Control, Invoice Matching, Vendor Analysis, EDI Support, and Online History. Buyer's Workbench provides information needed for buyers to complete their daily activities efficiently. Tel: (800) 543-3010; Fax: (513) 481-8332.

Client Server Technologies Inc. Continuum Purchase Order Management, an integrated client/ server module, is part of the Continuum Distribution series. Continuum PO allows the user to process any order type quickly and easily through the use of Continuum's Order Configurator included in this module. The PO Configurator controls processing events and the sequence that each order type is processed through the system. Matrix PO Inquiry provides the user with current information to help analyze purchase history. Included with Continuum PO is Document Writer, which allows the user to create and customize purchasing documents. Features include: Vendor Performance, Facsimile Integration, EDI Export Capabilities, Automatic Pricing, Additional Charge Processing, Order Copying, Automatic Replenishment, and Invoice Matching. Tel: (617) 6221414; Fax: (617) 622-1456; E-mail: sales@cstisoft.com

ClientSoft. ClientBuilder is a legacy extension and workflow reengineering development toolkit for building graphical

user interfaces (GUIs) to purchasing and financial host applications. It's deployed on Windows, Macintosh, and OS/2 clients accessing mainframe, AS/400, and SQL data sources. ClientBuilder 4.5 also can be used as middleware with most Windows-based development tools including Visual Basic, Visual Age, PowerBuilder C++, etc. through its library of proprietary DLLs and DDE links. ClientSoft says it offers developers "a simple way of using the industry's only objectbased, event-driven, fuzzy logic data stream recognition middleware to reliably integrate other desktop development tools with enterprise wide host-based data." Tel: (914) 6315365; Fax: (914) 631-6930; E-mail: info@clientsoft.com

Command Line. CLC-PM4 features user-defined inventory, purchasing, and supplier item masters and can include items to be tracked. Multiuser, PC-based real-time system creates POs automatically or semi-automatically for repetitively ordered or one-time only items including multisite delivery points, different due dates, quantities, and prices, with a minimum of key strokes. Change orders are handled rapidly with fully printed documentation. A screen display history of past purchases for repetitively purchased items is maintained. A purchasing requisition system can be provided, with allocations made by line item or total req against specific GL accounts. Reqs can be converted into RF(as or POs; old reqs or POs can be converted into new reqs or POs. Electronic approvals can be linked to budget or departmental authority, with automatic routing. Invoice processing module electronically matches PO, receipt, and invoice. System also accommodates advance payments, credits, freight charges, taxes, ERS (pay on receipt), etc. Payment information can be automatically uploaded to the AP and/or GL system. Tel: (908) 738-6500; Fax: (908) 738-6504.

Commerce. PurchaseSQL is a Windows-based client/server purchasing and requisition management system. Requisitioners select items from the Master Item catalog or generate new items. Items also can be searched from external supplier databases or can be accessed using CD-ROM. System automatically creates a formal requisition that can be routed through an approval process before being electronically released to the purchasing module. PurchaseSQL provides tools to source potential suppliers, generates RFQs, selects suppliers, and issues POs. System routes all PO information to the receiving module. It provides an automatic shipment problem report module, which enables the receiver to fax or EDI a preformatted problem report to the supplier. Receiving data is routed to the shipment module so items can be delivered to the initiating requisitioner. System creates an export file of accounts payable and GL financial data which can be imported into most accounting systems. Tel: (800) 447-7172; Fax: (914) 592-2109.

Credit Card Solutions. P-Card Solution 3.0 is a robust client/server software product that automates all aspects of the purchasing card process. It interfaces with the feed from any purchasing card provider (American Express, MasterCard, or Visa) and is specifically tailored to fit the user's operating environment and financial system. P-Card Solution allows each cardholder to receive his statement electronically at his workstation. Cardholders have capability of splitting a transaction into different item descriptions and valid charge codes. The software also features an online order log, which can be automatically imported with the electronic statement. When reconciliation is complete, P-Card Solution generates reports for management approval and sends costs directly to the financial system. Software consists of four modules: Administration, Reconciliation, Supplier, and Receiving. Tel: (509) 375-3268, ext. 314; Fax: (509) 375-4771.

Dun & Bradstreet. SmartStream Procurement's distributed architecture networks multiple business units for leverage. Automated processes reduce the length of procurement cycles-and employee workload. System accommodates pay-on-receipt, EDI, and procurement cards. It also provides features to evaluate and analyze supplier stability and performance. SmartStream Procurement allows users to complete requisitions via the corporate Intranet. No special software is required. Through the applet, users have access to central databases for online catalogs. Tel: (404) 239-2000; Fax: (404) 290-7374; E-mail: solutions@dbsoftware.com

Dynamic Software. QPII is a fully integrated purchasing management and inventory control system available in two versions: QPII 3.5, a valuepriced system for DOS and LANs; new QPII Gold, a premium system for Windows, DOS, Client/Server, Unix, VAX, and AS/400 systems. Both levels manage the purchasing cycle from requisitioning through receiving to invoice matching. Requisitioners can enter requisitions and check the status of POs online. QPII guides buyers through approval processing and supplier selection and automatically creates RFQs or POs from requisitions. Supplier quotes can be automatically converted to POs. QPII has a special program for managing supplier communications and maintains a "to-do" list of all scheduled buyer activities. System maintains complete inventory transaction and cost history and automatically generates re-order recommendations. It also maintains supplier performance ratings. Tel: (800) 627-1218; Fax: (864) 879-1233.

Electronic Purchasing Information Corporation (EPIC). CONNECTSUS from EPIC, an affiliate of Thomas Publishing Company, is a client/server system that connects buyers and suppliers through a streamlined, unbiased

online procurement and information management system. Buyers can research and compare products, enter orders online and transmit multiple orders simultaneously via EDI. CONNECTSUS enables suppliers to load their products into a database using the Thomas unique classification system, update product information, receive orders, and improve service to existing and potential customer. Tel: (212) 6133400; Fax: (212) 613-3449.

Excel Business Systems. SMARTBUYER base module includes Request for Bid, POs (standard, repeat, blanket, and supplier catalog), Tracking, Receiving, multi-level Electronic Approval, Flexible Reporting, EDI, and Data Import/Export. Individual line items can be split to different charge-tos, ship-tos, and delivery dates. Online item, supplier, and charge-to histories/evaluations are available. The Requisitioning module includes consolidations of similar items, multi-level electronic approval, and interface to electronic mail systems. The Inventory module provides for multiple storage locations, low stock warning, and automatic reorders. Tel: (800) 586-5876; Fax: (914) 238-9643.

Falcon. Blue Chip MRO Materials Management System is a comprehensive purchasing and inventory control software system designed with special requirements of maintenance, repair, and operational (MRO) inventories in mind. System supports the complete procurement cycle, for both stock and non-stock materials, from the creation of the requisition through the bid process, purchase, receipt, and issue from stock. Included modules are Requisitions, Request for Quote, Blanket Order Contracts, Purchase Order, Stock Room Control, Tool Kitting, Bill of Materials, Receiving, Job Costing, and others. Standard reports, including PO expediting, stock status, PO status, low-inventory alert, and others are available, as well as an optional report generator for ad hoc queries. Tel: (502) 575-9870.

Fiscal Systems. Purchase Order Processing (POP) supports multiple users, password protection, multiple companies with up to 99 divisions or locations within each company, serial number recordkeeping; and tracks cost by lot purchased by date and quantity. POP accounting module is part of a seven-module package containing also General Ledger, Accounts Payable, Accounts Receivable, Payroll, Inventory Control, and Sales Order Processing. Modules may function independently or as an integrated package. Tel: (205) 772-8920; Fax: (205) 772-8590.

Fisher Technology Group. SupplyLink 3.0 offers online, multi-supplier shopping capabilities, requisition management, supplier interfaces, and stockroom management. It consists of four linked, but independent, modules that support most client/server environments. The first, Electronic Mall, puts a library of customer-selected supplier catalogs, specification sheets, safety bulletins, and other supplier-specific information at the fingertips of users. Requisition Management module handles all requisitions and order processing through all phases of the purchasing cycle seamlessly, through all departments. An automated approval process and restrictions based on commodity types and dollar limits allow purchasing to quickly route the order appropriately. Electronic Supplier Interface module replaces manual transmission of orders and receipts with interactive and traditional EDI capabilities between the buyer and suppliers. Module automates RFQs, response to RFQs, POs, PO acknowledgements, and price catalog updates. For smaller suppliers, who may not be EDI-ready, automated fax transmissions are available. Stockroom Management module provides automatic replenishment, forecasting, and inventory analysis capabilities. Tel: (800) 9260460; Fax: (412) 490-8010.

Fogle Computing. FCC Purchase Order system is an "add-on" product for the FCC Stockroom Inventory system. FCC PO automatically generates POs for items that are low in stock in Stockroom (which the user can edit prior to printing). POs also can be manually input for stock or non-stock items. POs are tracked until received, and receipts of stock items automatically update the Stockroom files. Purchasing history is maintained by stock number and by supplier. Layout of the PO is user defined. Companion product, FCC Stockroom Inventory, is a multi-user system that monitors inventory and allocates its usage to departments (cost centers) within the organization. At month's end, the system produces a report summarizing usage. It is useful in any situation where items are issued from inventory, rather than sold; such as forms, tools, and office supplies. Tel: (800) 845-7594; Fax: (704) 697-9944.

Grace Computer Resources. Total Procurement Management System (TPMS) is a true client/server purchasing system that allows purchasing to fully automate the procurement process. From Material Requests to Requisitions, to Request for Quotations, to Bids, to Bid Analysis, to Purchase Orders, TPMS gives purchasing everything necessary for the purchasing cycle. Requests and POs are automatically routed for approval based on user profiles. It also includes import capabilities from material management systems, and export capabilities to accounts payable, invoice processing systems, and material receipt systems. TPMS includes a fully functioned EDI management system and also supports document printing, faxing, and imaging. Tel: (770) 9391743; Fax: (770) 939-8561.

Greentree Software. GT Purchase PRO 5.0 is a full-function purchasing and materials management client/server system for Windows. It supports purchasing, receiving, requisitioning, remote requisitioning, quotations, inventory,

invoice matching, importing, and exporting. Purchase PRO includes on-line authorization, supplier catalogs, supplier performance, contract price variance analysis, file cabinet, free form PO header, and line item text, multi-line account distribution, security levels, workflow scripting, e-mail, printing and direct faxing of POs and requisitions, Canadian GST/PST taxes, and minority supplier analysis. Purchasing, Requisitioning, Receiving, and Inventory can all be integrated into a single Materials Management application. Userdefinable workflow scripting allows users to tailor the system to follow their own business rules. Tel: (941) 954-2210; Fax: (914) 954-5095.

INFORMS. The Advanced Government Purchasing System (AGPS) is a solution that fulfills the purchasing needs for about one-fifth of state governments. AGPS has been refined/ enhanced and has been migrated for use by state agencies, city and county governments, larger school districts, colleges/universities, independent authorities, utility districts, etc. Current AGPS 6.0 is a comprehensive state-of-the-art purchasing system with a graphical user interface (windows-like) and/or text-based screens. All functions of the purchasing process have been automated, from initial requisition through solicitation, order generation, contract management, receiving, invoicing, and payment approval. A fundamental design aspect of AGPS is that data is entered into the system only once. From that point, it is automatically forwarded through the entire procurement cycle. Throughout the process, many functions occur automatically, such as generating bidders lists, printing orders, encumbrance of funds, three-way match, electronic approvals, bid tabulations, standard terms and conditions, etc. AGPS has a multi-layered security design that is enabled by user definable profiles. Numerous state-of-the-business processes (electronic commerce, online help, ad hoc report writing, etc.) have been included in the modular design. Tel: (334) 2770372; Fax: (334) 277-0557; E-mail: rogera@informs.com

Innovative Computer Concepts. Pinnacle is an advanced purchasing and materials management application designed for client/server enterprise-wide environments. Pinnacle incorporates today's supply chain practices, including electronic requisitioning, online catalogs, automated approvals and matching, EDI, event routing, workflow, and seamless integration with other systems. Pinnacle's GroupWorks product applies intelligent agent technology against the user's repetitive tasks, freeing him for valueadded work. ICC's total support package includes staff and technical training, systems conversion, project management, and systems integration. Tel: (800) 861-6019; Fax: (603) 644-1766; E-mail: ICC@incoco.com

Ironwood Computer Systems. FIXPRO is targeted at financial organizations, printers, office supply companies, distribution services, marketing organizations, and insurance companies. These organizations use FIXPRO to reduce costs by improving inventory management of inside consumables, forms, office supplies, and marketing materials. FIXPRO'S unique features include forms management and specifications, distribution, inventory control, purchasing, and print on demand. By printing on demand, complete with a faster requisition to purchase order cycle, inventories are reduced and customer satisfaction increased. Internal/external charges, Jetform, e-mail, and adhoc query are further supported by FIXPRO's base technology, SQL. Ironwood will customize FIXPRO to meet specific accounting rules in preparing financial data. Tel: (905) 890-4747; Fax: (905) 890-9107; E-mail: aasys@interlog.com

Kehlbeck & Associates. Purchasing Information Center (PIC) software has many new features based on its users' input. Buyers can make smart, timely decisions based on the information readily available from PIC. Everything a buyer normally has on his desk, in his desk, or in a file cabinet, is stored and easily accessible from PIC. Options include: Supplier Database, Bid List, Invitation to Bid (ITB), Automatic Conversion of ITB to PO, Purchase Order, Project Control, Receiving, Overdue, Expedite, Directory, Cash Flow, and Business Cards. Screen/Print capability is available on most options. Indefinite memo fields for long descriptions or specifications are included on each PO. More than 60% of the programs are customized to meet specific requirements of state governments, schools, offices, and industrial companies. Contract programming is provided. Tel: (502) 2283636; Fax: (502) 228-6086.

Lawson. Purchase Order system, an integrated module in the company's Open Enterprise Distribution Management and Materials Management packages, provides organizations with an easy-to-use system designed to assist in the management of procurements. Purchase order entry is accomplished with the use of blanket and standard orders, userdefined buyer limits, quantity and/or dollar receiving and invoicing limits, and multiple ship-to locations. Receiving handles serial numbers, lot numbers, inspections, reject/dispositions, freight allocations, and fourway matching with user-defined tolerances and exception processes. Lawson Purchase Order is fully integrated with its full suite of Webdeployable client/server business applications including financials, human resources, and distribution and materials management. Tel: (800) 477-1357; Fax: (612) 379-7141; E-mail: info@lawson.com

Legacy Systems Research. Cost-Benefit Analysis Tool helps buyers and their internal customers by ensuring that a solid business case exists for important purchase decisions. Software provides the same powerful, lifecycle costing tools formerly available only to financial analysts to personnel at all levels of expertise, in an easy-to-use graphical interface. The tool works in five basic steps to walk the user through the cost benefit analysis process and

documents the results in professionally formatted cost-benefit reports with graphs. Software is useful in make-or-buy, outsourcing, policy impact assessment, proposal evaluation, information technology procurement, feasibility studies, and more. Tel: (800) 920-1409; Fax: (208) 522-5401.

Loren Data. Electronic Commerce Purchasing System (ECPS), a PCbased electronic procurement management program, was developed for governmental and private buying agencies to streamline the procurement process. Modules handle requisitioning, small purchases, large procurements, electronic commerce, business daily posting and retrieval, contract management, blanket purchase agreements, supplier management, EDI transactions, and more. Its electronic mail design facilitates paperless communication between requisitioners, buyers, suppliers, legacy accounting systems, and outside information services. Tel: (800) 745-6736.

LS DataNet Systems. LS Business and Manufacturing software is a multi-user integrated software package for automation of materials and resource management. Graphical software manages requisitions, POs, supplements, quotations, blanket orders, releases, contracts, approvals, suppliers, expediting, receipts, stockrooms, assets, invoices, appropriations, charges, personnel, chemicals, and more. Security features include passwords, authorities, and audit trails. Advanced search features allow quick retrieval of items. Tel: (800) 738-3666; Fax: (970) 262-6271; E-mail: colo.com/lstdata.net Macola. Macola Software Progression Series Accounting, Distribution, and Manufacturing are fully integrated and consist of 22 modules. Purchase Order enables users to analyze the quality, accuracy, and promptness of the delivery of all purchased materials. It helps ensure that the correct quantity and quality of materials is available when it is required. Features include: print POs, change POs, and process cancellations; report scheduled receivings; enter and edit POs and receivings; purchase materials to be drop shipped directly to customers; perform on-screen inquiries for each PO; analyze suppliers' quality, performance, and price variance; track receivings by lot and serial number; and use multiple supplier part numbers for each inventory item. Tel: (800) 468-0834. Fax: (614) 382-0239.

Manufacturing Information Systems. MISys Manufacturing System includes multi-level BOMs, integrated purchasing, inventory control of raw materials, resources, WIP, and finished goods; time-phased production scheduling, work orders, material requirements planning (MRP), job costing, revision control, multi-location, bar coding, and custom reporting. It works fully integrated with Computer Associates's ACCPAC Plus (DOS) or CA-ACCPac/2000 (Windows) accounting software. Tel: (800) 833-1500; Fax: (802) 457-4602; E-mail: misys@sover.net

Microcomputer Specialists. MISys Manufacturing System offers integrated purchasing in its Inventory module, part of the MISys Manufacturing System for small to mid-sized manufacturers. Inventory module offers inventory control of raw materials and resources, WIP, finished goods, and multi-level bill of material. Users can add the Scheduling module, which provides work order, timephased production scheduling and MRP. Module provides extensive job costing and integration with ACCPAC Plus accounting. Tel: (800) 833-1500; Fax: (802) 457-4602.

Negotiator Pro. Negotiator Pro is a professional preparation and training tool that helps users create an effective plan for any negotiation by sparking creative thinking about strategy and tactics for success. It includes a small expert system to profile the personality and negotiating styles of each of the parties. This feature helps users identify and understand interpersonal issues that often influence a negotiation. There are three modules that can be added onto Negotiator Pro: Purchasing, Supplier Relations, and Inventory Control. Tel: (617) 738-9300; Fax: (617) 7343308.

Palmas Development. PURCHASING plus+ is a family of 12 fully integrated software modules designed to facilitate purchasing and related functions in medium to large organizations in all sectors. The main purchasing module includes PO generation/tracking/ expediting, receiving, item history tracking, department charge tracking, supplier performance, import/export (data interface), EDI ready, reporting, and system security. Optional modules include Faxing, Graphing, Requisitioning (including electronic routing/approval), Invoicing and AP Interface, Request For Quotation, Inventory Control, Bill of Materials, Asset Management, Preventive Maintenance, Forms Control, and Subscription Management. Tel: (800) 5063366; Fax: (416) 784-9411.

PeopleSoft Purchasing. Software automates requisitioning, purchasing, and receiving of raw materials, supplies, services, products, and assets, enabling buyers to manage sourcing, supplier selection, and ongoing contracts. PeopleSoft Purchasing is a module of PeopleSoft Distribution which also consists of Inventory, Order Management, and Distribution Requirements Planning modules. PeopleSoft Distribution reinvents traditional ways of performing distribution and purchasing functions. Users are empowered to make purchasing decisions accessing past supplier history and pricing information, while tight integration with PeopleSoft Financials provides coordination with the accounting and administration functions critical to controlling purchasing decisions. Tel: (510) 225-3000; Fax: (510) 225-3100.

P.O. Express. P.O. Express Base System includes Purchase Orders (many types and revisions), Electronic Signatures, PO Approvals, Faxenabled, System Tables, Supplier Management, Standard Forms, Catalog/Stock Items, Comments, Security, and Reports/Graphs. P.O. Express also offers add-on modules: On-Line/Remote Requests, Electronic Routing & Approvals, RFQs, Receiving, Inventory Control, Asset Management, File Load Utilities, API, EDI, and Custom Forms. Tel: (800) 793-5050; Email: sales@pox.com

PowerWay. Supplier Quality 9000 is a powerful, easy-to-use Windowsbased software package that allows purchasing to evaluate suppliers of goods and/or services. It assists with critical, cost-effective supplier assessments. Software is particularly valuable, PowerWay says, to departments who must demonstrate good supplier management for ISO 9000 compliance. With this product, users configure custom evaluations for varying classes of suppliers. Evaluations can be scheduled for periodic review. Information about a specific supplier, class of supplier, or supplier product can be displayed instantly and compared to other suppliers as a metric for performance. Tel: (800) 964-9004; Fax: (317) 577-0450.

Purchasing on-line. Software has been designed specifically to provide the time and information necessary to negotiate prices, reduce inventory, and improve quality. System eliminates paper requisitions and internal expediting by allowing requisitions to be entered, and their status reviewed, from any workstation. Requisitions are automatically queued for approval. Three levels of approval are provided with redirecting capability. Buyers may automatically attach line items or an entire requisition to a PO. System includes a suggested commodity coding scheme that provides for simple retrieval of non-stock items. Nonstock purchase analysis reports suggest items to be considered for stock or blanket POs. Supplier analysis reports track ontime performance as well as non-compliance. Tel: (800) 3883914; Fax: (305) 2944230.

Purchasing Pro Software. Purchasing Pro is a stand-alone program for use in large or small companies. Council Pro is custom software for multi-location purchasing. Programs automatically issue RFQs and POs electronically or traditionally on the user's forms. Program includes a supplier module for electronic and/or hard copy bid proposals. Programs include built-in comparison of bids and allocation screen for contract awards and automatic issuance of POs, or annual contract/blanket order releases and status reports. It sets up more than 200 forecasts, reports, and statistics which can be viewed on screen and sent to printer. Buyers can upload or download data from existing mainframe or PC systems. Tel: (214) 542-6055; Fax: (214) 542-5985.

Purchasing Solutions. First Rate is a cost-based supplier rating and evaluation software package that loads data from the user's existing purchasing, quality, and receiving systems; analyzes the data and provides a cost-based rating of each supplier. First Rate tracks each supplier's performance and compares it with other suppliers. When bid prices are entered into the system, First Rate will objectively evaluate bids based on a supplier's previous performance and recommend the supplier providing the best overall value. First Rate, the company says, is easy to use, and "will withstand the most stringent audit." First Rate will meet ISO 9000 requirements. Tel/Fax: (503) 617-1525; E-mail: 75321.1653@Compuserve.com

Purchasing Systems Technologies. POWER 1000 Purchasing System 2.0 includes all purchasing functions from requisition to receipt, for both stock and non-stock items, as well as blanket POs, complete buy history, inventory control, RFQ generation, quote tracking, expediting, sourcing, invoice matching, and a complete ad hoc report generation tool. New functions for version 2.0 include best buy for online sourcing, the Expedite Workbench to help speed expediting, quote analysis, and ISO 9000-compliant supplier performance rating. MRP reporting system, products file, and bills of material are designed to aid the buyer in predicting inventory needs and quantities. POWER 1000 Note Pad allows the buyer to track unrelated, supplier specific, or date specific notes, and generate tickle lists for future events. P-mail function is an internal e-mail system that can also be integrated into processes and functions. POWER 1000 offers extensive connectivity features and is compatible with EDI, fax, bar coding, and CD-ROM technologies. PST also offers the POWER 1000 Lite Purchasing System for non-manufacturing and MRO environments. Tel: (303) 790-0301; Fax: (303) 7902540.

Renaissance. International Logistics System (ILS/400) is an enterprise supply-chain management system designed to meet the requirements of manufacturing, wholesale, and distribution companies. ILS/400 is a multiwarehouse, multi-company, and a multi-currency product supported by Renaissance's installation, implementation, and maintenance service programs. Warehouse Master is a multi-warehouse system that has sophisticated inter/intra warehouse functionality, including bar coding, radio frequency, and EDI. Tel: (800) 281-2639; Fax: (516) 466-3341. **Rohbe.** Rohbe specializes in PC software tools that rate supplier performance. Supplier Analysis System is designed to be an extension of an organization's existing MRP/purchasing/ERP system, and can be accessed easily by multiple groups within an organization. System can be tailored to any environment and is designed for easy interface to existing systems. It's also available with Inspection/ Corrective Action modules. Tel: (410) 715-0628;

Fax: (410) 715-0685; E-mail: urohbe@clark.net

ROI Systems. ROI's Enterprise Resource Planning (ERP) system for small and mid-sized discrete manufacturers eases planning and production, purchasing, sales and service management, accounting, and engineering at one or more facilities. CTO, JIT, high-volume repetitive, make-to-stock, and make-to-order are supported. ROI says it offers fast, out-of-thebox management reporting using COGNOS PowerPlay software and data warehousing. Integrated bar coded data collection, fax, e-mail, EDI, foreign currency exchange are used throughout. Tel: (800) 544-7849; Fax: (612) 595-9450.

Software Arts. pc/MRP is a complete business management system containing 10 integrated modules: Address, Inventory, Purchasing, Receiving, Sales, Invoicing, Bills of Materials, Stock Room, and Accounting (GL, AP, AR). Modules can be used on a standalone or integrated basis. pc/MRP can be configured to support manufacturing, distribution, or retail operations. pc/MRP is available in both DOS and Windows, and can be upgraded to multi-user DOS networks such as  Novell. Purchasing module allows the user to enter, edit, and print POs and reports. POs can be faxed directly from the user's PC. Address and part number info can be scrolled and imported from their respective modules. More than 100 purchasing reports can be generated including consolidated ordering requirements, all overdue POs, purchase price variation, and purchase history reports. In addition, POs can be created automatically from existing sales orders. Tel: (408) 248-6445; E-mail: www.pcmrp.com

Software 2000. Software 2000 series of Materials Management 2000 consists of Purchase Management 2000, Inventory Control 2000, Customer Order Processing 2000, Accounts Payable 2000 (with Matching), and Electronic Exchange 2000 for EDI and fax. Purchase Management 2000 handles the procurement cycle from requisition through supplier performance analysis. Products within the MM2000 series can be used in an integrated or independent mode. Features include on-demand criteria-weighted supplier performance analysis, userdefinable requisition and PO types, sourcing screens, internal/ external notes, and requisition-approval processing. Tel: (508) 778-2000; Fax: (508) 790-6784.

Solomon Software. Solomon IV for Windows accounting information system offers a full suite of accounting, operations, and distribution modules, including a Purchasing module to help maintain a consistent and organized relationship with suppliers. With this module, purchasing can quickly produce POs and receipt records. Purchasing module features multiple order types, flexible receipt processing, the ability to purchase and receive kits or kit components, supplier performance analysis, receipt quantities variance control, and automatic voucher creation from PO receipt entry. Tel: (419) 424-0422; Fax: (419) 424-3400.

Structured Computer Systems. REALITY addresses all business functions in the supply chain of complex purchasing and materials management environments. REALITY P&MM offers Web-enabled requisitioning with access to approved suppliers' Web-based catalogs; userdefined multi-level approval routing schemes; realtime budget checking, encumbrance and pre-encumbrance accounting with API capability to external accounting systems; bids and quotes creation, tabulation, and award; multi-warehouse inventory management; fixed assets management including barcodeenabled physical inventory control; powerful purchasing automation including exclusive "Lights Out Purchasing" capability; electronic commerce using X.12 EDI supporting more than one dozen transactions and auto-fax communications. REALITY A/P offers hands-free three-way invoice match; flexible voucher management and payment cycles; full support for employee expenses including pre-travel authorizations; X.12 EDI support for invoices and payments. Tel: (860) 677-0222; Fax: (860) 677-7157.

Tangible Vision. Imprimis is an Enterprise Resource Planning/Manufacturing Execution System that supports multicountry, multi-facility, multi-currency, and multilanguage environments, and addresses Make-to-Order operations. Key purchasing features include purchase requisitions with multilevel authorization, automatic conversion of purchase requisitions to POs, stock reorder planning, automatic creation of POs from stock reorder plan, blanket POs, PO reservation, automated purchasing/credit card payment, centralized purchasing capability, supplier certification, supplier performance tracking, receiving, incoming material inspection, and batch/serial tracking. Tel: (708) 969-7517; Fax: (708) 969-7523.

Taranto & Associates. Accounts Payable/Purchase Order tracks and controls the bill-paying functions. It includes a Purchase Order module to track outstanding orders. It controls when invoices are paid, prints checks, distributes expenses, and reconciles bank statements. It records how much is bought from each supplier and maintains a complete audit trail of bills and payments. It is a standalone application or can be integrated to Inventory Control for merchandise ordering and stock control. It also can be integrated to General Ledger for automatic posting of distributed expenses and cash. Features include: Full Purchase Order module for tracking purchases; accepts handwritten or offline checks for supplier analysis and expense distribution; selects bills for payment by individual

invoice, and by supplier and/or due date; full cash control including reports of open items, with aging, and close items (paid invoices); full audit trail; easyto-void checks and re-open invoices; prints checks and check register; supplier analysis report with current and prior year totals; provides for canceled, voided, and outstanding checks for bank statement reconciliation; distributes expenses and purchases, sorts by account number, and lists on account summary report; includes journals from other subsidiary ledgers, if integrated. Tel: (800) 5228649; Fax: (415) 472-2673.

Technical Services Associates. Features of GATEWAY C/S include on-line requisitioning, RFQs, multiple order types and revisions, and extensive validation process, routing and approvals with electronic signatures, standard laser forms, and reporting (with graphic interface). Throughout the entire system, GATEWAY C/S provides automated data entry through the use of catalog, stock, inventory, supplier, and system tables databases. To further tailor the system, modules such as Receiving, A/P Interface, Import/Export Utilities, Inventory Options, Asset Tracking, and Documents Manager are also available. Software has capability to communicate via multiple currencies/languages, e-mail, fax, custom laser forms, and EDI. Tel: (800) 3881415; Fax: (717) 691-5690; E-mail: info@tsagate.com

WEFA Group. COSTER monitors suppliers' input costs, and selects/ develops appropriate escalators for contracts. As a budgeting tool, software presents insight into historical and future price changes for materials purchased. It is also a graphical package that provides capability to visualize price trends. Tel: (610) 6902676; Fax: (610) 490-2770; E-mail: wefa.com/cphome.html

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An Asian Wall Street Journal Roundup. **Asian Wall Street Journal.** New York, N.Y.: Mar 5, 1999. p. 9

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Mark Feeney, Globe Staff. **Boston Globe.** Boston, Mass.: Dec 11, 1997. p. C.1

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Thomas, William D. **Monthly Labor Review.** Washington: Jul 1996. Vol. 119, Iss. 7; p. 3 (10 pages)

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Wilson, Linda. Computerworld. Framingham: Jul 17, 1995. Vol. 29, Iss. 29; pg. 71, 2 pgs

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Subjects: Systems integration, Retailing industry, Problems, Point of sale systems, Inventory management, Electronic
Classification Codes 9190 US, 8390 Retail stores, includes groceries, 5330 Inventory management, 5250 Telecommunications
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Despite all the talk about using POS data - information gathered at store checkout counters by scanning barcode labels on merchandise - very little has actually happened when it comes to using the data to move goods from manufacturers to retailers. The same is true for combining daily POS data with historical sales information, sales promotion schedules, current stock inventories, and other data. It will not be easy for IS executives. For starters, the sheer volume of POS data is enough to scare off many manufacturers. Replenishment and logistics software for handling daily POS data and combining it with other data is only now becoming available.

Full Text (1016 words)

Copyright CW Communications/Inc. Jul 17, 1995

Like a 6-year-old contemplating a 10-meter diving board, Perry K. Youngs feels a bit hesitant about taking the plunge.

Youngs, a manager of marketing information at food and apparel manufacturer Sara Lee Corp., says he wants to keep his demanding retailers happy. Specifically, he'd like to be able to take daily point-of-sale (POS) data from his customers' stores and use it to directly replenish merchandise, he says.

The trouble is the data is so new that figuring out how to use it is uncharted territory, says Youngs, who works at Sara Lee's meat group headquarters in Cordova, Tenn. Furthermore, "we don't have the systems in place to analyze the data or common systems throughout our company," Youngs says.

Despite all the talk about using POS data--information gathered at store checkout counters by scanning barcode labels on merchandise--very little has actually happened when it comes to using the data to move goods from manufacturers to retailers. The same goes for combining daily POS data with historical sales information, sales

promotion schedules, current stock inventories and other data.

The result: "There is more conversation out there than there is actual work going on," says John Baumgartner, vice president of information systems at Oxford Industries Corp. in Atlanta. Most manufacturers still replenish retailers' stock based on warehouse withdrawal data.

While Youngs says he is willing to work with POS data, many other manufacturers question whether the benefits of using it outweigh the cost of handling such a large volume of data.

But processing POS data is likely to pop to the top of the list of priorities—and headaches—for any IS manager involved with consumer goods. Many retailers are no longer willing to pay for the added costs of warehousing inventory or sorting and repacking merchandise. They increasingly want merchandise packaged in store-ready assortments that are shipped as soon as needed to restock store shelves. Just as giant retailers such as Wal-Mart Stores, Inc. in Bentonville, Ark., used their purchasing power to force manufacturers to adopt electronic data interchange (EDI) and automated inventory replenishment, they could force manufacturers to incorporate POS data into their forecasting and replenishing processes.

For IS executives, the message is clear: Start developing systems to deal with POS data. Begin integrating hardware and software throughout the company. Then use those systems to drive the entire order creation, resource planning and manufacturing process.

It won't be easy.

Frightful volume

For starters, the sheer volume of POS data is enough to scare off many manufacturers. "You are talking about hundreds of times of increase in the amount of data you are running," says Tony Ferrante, manager of customer service and logistics at Rubbermaid Inc. in Wooster, Ohio.

Ferrante says Rubbermaid's current system can handle the load. However, Greg Owens, managing partner of logistics strategy practice at Andersen Consulting in Chicago says even the largest manufacturers aren't equipped to act on POS data.

Owens recalls a recent meeting he attended of "one of the Top 3 largest retailers and one of the Top 3 manufacturers." At the meeting, Owens recalls, the retailer handed the manufacturer a printout of one day's POS data. The manufacturer said, "I can't do anything with this."

Scarce software

As hardware becomes more powerful and prices drop, the cost and feasibility of crunching POS data will become less of an issue. In the meantime, however, replenishment and logistics software for handling daily POS data and combining it with other data is just becoming available. Only seven manufacturers use a Unix-based solution from IRI Logistics, Inc., a wholly owned subsidiary of Information Resources, Inc. in Chicago. A partnership between A. C. Nielsen Co. in Schaumburg, Ill., and Manugistics, Inc. in Rockville, Md., includes plans to have a similar solution available next year.

Disintegration

Another problem is that most manufacturers still haven't integrated their systems to take full advantage of the information they already collect from retailers. At Warner-Lambert, Inc. in Morris Plains, N.J., for example, the inventory replenishment system isn't integrated with production planning. Each of its business units has its own manufacturing systems.

Is the data correct?

Often the POS data that retailers capture isn't entirely accurate. "Historically, the data has been so bad that it would take you months to clean it up," Youngs says.

One problem is that sale prices often aren't entered into POS systems or are entered incorrectly. Clerks often don't scan each item when they ring up more than one item of a similar type. When that happens, important details such as the type of soup or the color of a shirt are lost.

Can't get it

Clean or not, POS data isn't always available. Many retailers--particularly in the grocery industry where third-party vendors obtain raw POS data, clean it and then sell it--won't share POS information directly with manufacturers.

Culture clash

Sometimes corporate cultures get in the way of change. That's a problem Warner-Lambert is trying to overcome. Since October, the company has been using a combination of warehouse withdrawal data and promotion schedules to develop replenishment orders for ~~Kmart Corp.~~ and other retailers. But Warner-Lambert salespeople, who develop price and promotion schedules together with their retail clients, aren't used to talking with Warner-Lambert inventory management analysts, who oversee the replenishment process. That communication is critical for using POS data to accurately forecast consumer demand.

"The reality is we need to work a lot harder to make sure there is a freer exchange back and forth," says Jay Nearnberg, director of partnership technologies at Warner-Lambert. One idea to improve this is to offer an incentive program that encourages team work.

Despite stumbling blocks to a smoother, more efficient supply chain, merchants eventually will use their market power to force change, much as they did to force manufacturers to adopt EDI. The three largest mass merchants ~~Wal-Mart~~, ~~Kmart~~ in Troy, Mich., and ~~Target Stores~~ in Minneapolis--account for \$74 billion in annual sales, according to Discount Store News.

"The manufacturers are going to have to take ownership of this [POS] data," Owens says. Like it or not, working with daily POS data is likely to become a reality for manufacturers.

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